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studied the behavior of plants in which lateral movement of water was made necessary by the ordinary method of incisions on opposite sides. Only the first set of experiments throws any new light on the question of the rise of sap.—WILLIAM CROCKER.

Phylogeny of Filicales.—BOWER[15] has begun the publication of a series of studies in the phylogeny of the Filicales, and the first paper presents the singular and poorly known genus *Plagiogyria*. It is grouped among the Polypodiaceae, and even merged with *Lomaria*, but the position is anomalous on account of the oblique annulus. Several species were secured, both oriental and occidental, and the results may be considered fairly representative for a genus of eleven species. The conclusions are that the genus is quite a distinct one, deserving to stand apart from *Lomaria* or any other genus; that it is relatively primitive, as shown by stelar structure, leaf traces, venation, etc.; that it has resemblances to the Simplices, but that its characters indicate that it is rightly placed among the Pterideae; and that its "mixed" sorus, without any "gradate" sequence of sporangia, combined with its primitive characters and its affinity to the Pterideae, shows that the Mixtae have probably come directly from the Simplices, rather than by any of the Gradatae.—J. M. C.

Geotropism and split stems.—SCHTSCHERBACK,[16] working in PFEFFER'S laboratory, has carried on a series of experiments on the geotropic reactions of split stems. In the main, *Lupinus albus* was used, for in this form the tissue strains between cortex and pith are slight. Splitting cuts the rate of growth even in the vertical position, but two equal halves grow with equal speed in that position. If the two halves are placed horizontally, with the split faces together and horizontal, the lower half is favored in its growth and the upper half greatly inhibited, or even entirely stopped in most cases. Restoring the two halves to their normal vertical position restores them to equal growth, and rotating them 180° on the horizontal axis, to give an interchange of position, gives an interchange of rates of growth. The same geotropic inhibition and favoring of growth occurs in the two separated halves of the stem as occur in their intact condition.—WILLIAM CROCKER.

Relation of living cells to the rise of sap.—RORHARDT,[17] in his voluminous article on the part played by living cells in the rise of sap, has followed the method of wearying the reader with the publication of his notebook, instead of preparing a concise statement of his methods and results. Of the 125 different species of herbs and shrubs native to Germany, representing various monocotyl and dicotyl

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[15] BOWER, F. O., Studies in the phylogeny of the Filicales. I. *Plagiogyria*. Annals of Botany **24**:423–450. *pls. 32, 33. figs. 5.* 1910.

[16] SCHTSCHERBACK, JOHANN, Die geotropische Reaktion in gespaltenen Stengeln. Beih. Bot. Centralbl. **25**^{1}:358–386. 1910.

[17] RORHARDT, P. A., Ueber die Beteiligung lebender Zellen am Saftsteigen bei Pflanzen von niedrigen Wuchs. Beih. Bot. Centralbl. **25**^{1}:243–357. *figs. 2.* 1910.